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BLACK POD DISEASE OF OF COCOA

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INTRODUCTION

Black pod is the most serious disease of cocoa in Papua New Guinea. It is caused by the fungus *Phytophthora palmivora*. The fungus attacks pods of all ages and also causes bark canker, chupon wilt and seedling blight.

SYMPTOMS

The first symptom of black pod disease is one or more dark brown spots on the pod or cherelle. The spots have a distinct edge and can appear anywhere on the pod surface. The spots spread to cover the whole pod in about a week, after which the pod turns black and dries out.

Other fungi can cause diseases which look similar to black pod, but these are usually associated with wounds, such as those caused by mirids, pod borers or careless hooking (harvesting). You can tell the difference between black pod disease and other pod rots by examining the brown spots. Black pod spots are firm, whereas other fungi cause soft spots.

SPREAD OF THE DISEASE

The fungus grows from spores, which can be produced on any

Black pod infections can start anywhere on the pod

affected part of the tree. As the fungus can live in soil, spores can also come from the soil.

In new blocks of cocoa the first source of black pod infection is most likely to be the soil. Spores from the soil are carried by rain splash to pods and flush leaves close to the ground.

Some ants carry soil up the trees. They use the soil to build mud tents over their runways or over sucking bugs from which they feed. They carry the black pod fungus from the ground to the upper parts of the tree.

Spores are produced on freshly infected pods in very large numbers when the humidity is high. Rain spreads the spores from pod to pod either by splashing or by washing spores down the tree. Once black pod is established in the cocoa canopy, most pod or cherelle infections come from other infected pods. The disease spreads fastest when there is a lot of rain and the days are cloudy. Pod losses are greatest on trees where black pods are left unhooked high in the tree.

DISEASE CONTROL

1. CULTURAL

Any practice which reduces humidity within the cocoa tree will reduce the rate of disease spread. The first step in disease control, therefore, is to make sure that the cocoa does not have too much shade. In open areas and around the edge of the cocoa block, grass and other weeds must be controlled. Harvesting at least every two weeks will reduce the number of ripe pods lost to black pod disease.

Removing chupons is a very important part of management practice. Regular removal of chupons will remove one possible source of black pod infection, and will also remove a source of canker. Removal of chupons also stops trees from growing too tall. This is important as hooking and spraying are difficult on very tall trees.

Tent building ant species can be excluded from new or redeveloped cocoa blocks by introducing crazy ants about 18 months after the new cocoa trees are planted (see the Entomology Bulletin on pp. 163-168 of this issue). This should also slow down the rate at which black pod infects the young trees.

Good management practices will make direct control measures against black pod more effective.

Removal of infected pods

Freshly infected pods should be removed every week especially during the wet season. During wet weather, most new infections come from other freshly infected pods. Removal rounds should be separate from harvesting rounds. This reduces the risk of transferring the fungus from infected pods to healthy flower cushions where cankers may start.

It is important to check carefully the upper parts of the cocoa tree for infected pods and to remove them. These pods are most likely to infect other pods.

Hooked black pods should be removed from the cocoa block. If they are removed, less *Phytophthora* will be returned to the soil.

After 2 or 3 weeks without rain, make a special effort to strip all the old black pods and cherelles from the trees. This will slow down the start of the next outbreak of black pod disease. This is because a few spores can survive in old, dried out black pods and cherelles when it is dry for a long time. These spores can become an important source of infection when the next rain falls.

2. CHEMICAL CONTROL

Fungicide sprays are only profitable on high yielding cocoa (more than 600 kg dry bean per ha). They are recommended only for Keravat clones, hybrids or, if the management is very good, for blocks established from Keravat Trinitario seed. To achieve the greatest profit from a black pod spraying programme, all other pests and diseases must also be well controlled.

Fungicides

Fungicide sprays are most often needed during the wettest time of the year when black pod is most severe and the weather is unpredictable. Ridomil is a systemic fungicide that can be sprayed on cloudy days right up to the time it rains. It should not be sprayed in the rain.

You can buy Ridomil from New Guinea Cocoa Ltd and other Suppliers as a powder (Ridomil 72+) in 1, 5 or 25 kg packs, at about K21 per kg. This is a new type of Ridomil and we have not yet worked out the best rates. Please contact L.A.E.S., Keravat when you need to apply the fungicide and we will suggest how much you should use.

Ridomil is also available as 25 wp in 50 g packets. This should be applied as a 0.2% solution which is prepared by mixing 50 g Ridomil 25 wp with 25 litres of water. This should be sprayed from a knapsack sprayer.

Choice of sprayer

Two types of sprayer are available: motorised mistblowers and hand pumped knapsack sprayers. Mistblowers have a faster work rate and can reach pods 5 to 6 metres up in the tree but much of the spray misses the pods. Knapsack sprayers are much slower and a long lance extension is needed to spray pods between 2 and 3 metres above the ground; pods higher than 4 metres cannot be sprayed without climbing the trees. Knapsack Sprayers can direct the spray at individual pods or branches so, less chemical is needed to effectively control black pod than with mistblowers.

So, for small trees less than 5 years old and for clonal trees of any age, hand pumped knapsack

Black pod control using a knapsack sprayer.

sprayers are more suitable for smallholder use.

Mistblowers are better for tall trees and for plantations where high work rates are needed to reduce labour requirement and where a mechanic is available to maintain the machines.

Typical work rates in mature seedling cocoa are 1 ha in 2 hours with a mistblower and 1 ha in 8 - 10 hours with a knapsack.

Application

Mistblower

(1) Direct sprays at pods, cherelles and flowers only.

(2) If monthly applications are impractical then the dose can be doubled and applied every 2 months.

(3) Clonal trees always take longer to spray than seedling trees so to apply the same amount of fungicide per tree you should reduce the concentration.

Knapsack

(1) The fungicide should be applied as a fine spray to flowers, cherelles and pods.

(2) A long lance should be used to reach the upper parts of the trees.

(3) Do not use a sprayer which has previously been used for herbicide (weedicide) spraying.

(4) Big trees will need more spray than small trees so 20 litres of spray would be enough for 100 small trees or 60 big trees.

All sprays

The black pod spores are spread by rain so most spore dispersal is downwards. The most dangerous black pods are therefore those at the top of the tree. It is important to make sure that fungicide reaches the top of the tree. Spray operators must direct either the mistblower sprays, or knapsack sprays with a long lance, at the pods at the top of the tree as well as at those lower down.

Operator safety

Ridomil is not very poisonous to man but suitable precautions should be taken by all persons handling the chemical. Gloves, respirator and goggles should be worn by those involved in mixing the chemical; in addition, light overalls and a hat should be worn by spray operators. Operators should not eat or smoke during spraying. Fungicide splashes should be washed off the skin immediately, and all operators should wash with soap before eating. All clothing should be washed after spraying.

FURTHER INFORMATION

If you would like further information on black pod control, you should contact:

The Officer-In-Charge
L.A.E.S., P.O. Keravat,
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